

### **REMARKS**

Applicants appreciate the Examiner's thorough consideration provided the present application. Claims 48-65, 68-71 and 81-89 are now present in the application. Claim 54 has been amended. Claims 81-89 have been added. Claims 48 and 85 are independent. Reconsideration of this application, as amended, is respectfully requested.

### **Claim Objections**

Claim 54 has been objected to due to the presence of minor informalities. In view of the foregoing amendments, in which the Examiner's helpful suggestions have been followed, it is respectfully submitted that this objection has been addressed. Reconsideration and withdrawal of this objection are respectfully requested.

### **Claim Rejections Under 35 U.S.C. §§ 102 & 103**

Claims 48-55, 59-65 and 68-71 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Masaaki JP 61-046290. Claims 56-58 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Masaaki in view of Spero, U.S. Patent No. 3,911,318. These rejections are respectfully traversed.

Independent claim 48 recites a combination of elements including "[a] fluid treatment apparatus comprising: an ultraviolet light source including an ultraviolet lamp; a microwave energy source for exciting said ultraviolet lamp; and a waveguide for guiding microwave energy originating from said microwave energy source to the ultraviolet lamp, said waveguide being UV transparent and wholly surrounding the ultraviolet lamp, wherein the waveguide is provided with

a blocking end flange; and a housing for said ultraviolet light source, said housing having an inlet and an outlet, the housing shaped to guide flow of a fluid to be treated from the inlet, past the waveguide to the outlet.” Applicants respectfully submit that the above combination of elements as set forth in independent claim 48 is not disclosed nor suggested by the references relied on by the Examiner.

In particular, independent claim 48 recites “a waveguide for guiding microwave energy originating from said microwave energy source to the ultraviolet lamp.” Applicants respectfully submit that claim 48 explicitly recites that the waveguide acts to guide microwave energy from the microwave energy source to the ultraviolet lamp.

#### Waveguide of Masaaki

Masaaki recites (at claim 1 thereof):

“... a microwave generation source, an antenna for launching microwaves generated by the microwave generation source, an airtight gas discharge chamber that is formed around the antenna and sealed with a discharge medium for generating a discharge by receiving the microwaves from the above-mentioned antenna ...”

Referring to Figs.1 and 4 of Masaaki, it is submitted that guiding of microwave energy from the magnetron 21 to the airtight discharge chamber 18 is by way of waveguide 22, coaxial cable converter 23, coaxial cable 24 and rod-shaped antenna 13 only. It is therefore submitted that waveguide 22, coaxial cable converter 23, coaxial cable 24 and rod-shaped antenna 13 are the only elements that Masaaki describes that have any microwave-guiding function, and therefore, that only these elements may be regarded as the ‘waveguide’ of Masaaki.

Ultraviolet lamp of Masaaki

Referring again to Figs. 1 and 4, and also to the JP translation on page 8, line 20 to page 9, line 21, it is further submitted that the 'lamp' of Masaaki is provided only by the gas discharge chamber 18 formed within the airtight chamber 15 as defined by inner pipe 16 and outer pipe 17.

On page 8, lines 20 to page 9, line 2 of the JP translation, it is stated:

“... if microwaves are launched into the gas discharge chamber 18 through the antenna 13 by operating the microwave generator 21, a discharge is generated in the mercury and the argon gas in the gas discharge chamber 18, and ultraviolet rays in a region with a wavelength of 254 nm, are radiated.”

On page 9, lines 14-18 of the JP translation, it is stated:

“... ultraviolet rays with a prescribed wavelength excited in the gas discharge chamber 18 by the discharge are passed through the outer pipe 17 and radiated into the water ...”

Guiding of microwave energy from the microwave energy source to the ultraviolet lamp of Masaaki

Claim 48 of the present application recites

“a waveguide for guiding microwave energy originating from said microwave energy source to the ultraviolet lamp.”

It is submitted that in Masaaki, the microwave energy is guided from the magnetron 21 via a 'waveguide' comprised of waveguide 22, coaxial cable converter 23, coaxial cable 24 and rod-shaped antenna 13 only to the 'ultraviolet lamp' comprised by the gas discharge chamber 18 formed within the airtight chamber 15 as defined by inner pipe 16 and outer pipe 17 only. Further, the effect of this guiding is shown in Fig. 2 as described at page 9, lines 9-21 of the JP translation: Ultraviolet rays radiate out from the gas discharge chamber 18 to the water.

Relation of 'waveguide' to 'ultraviolet lamp' in Masaaki

Claim 48 recites

“ ... a waveguide for guiding microwave energy originating from said microwave energy source to the ultraviolet lamp, said waveguide being UV transparent and wholly surrounding the ultraviolet lamp ...”

It is submitted that the 'waveguide' (waveguide 22; coaxial cable converter 23; coaxial cable 24; antenna 13) of Masaaki does not wholly surround the 'ultraviolet lamp' (airtight chamber 15; inner pipe 16; outer pipe 17; gas discharge chamber 18) thereof. Rather, the 'ultraviolet lamp' (15; 16; 17; 18) surrounds the antenna 13, which is opposite to the requirement of claim 48.

Accordingly, it is submitted that claim 48 clearly define the present invention over Masaaki, and that nothing in Masaaki would guide one skilled in the art to the features of claim 48 that a waveguide wholly surrounds the ultraviolet lamp. Rather, it is submitted that Masaaki would provide reverse guidance to one skilled in the art.

Outermost pipe 32 of Masaaki

The Examiner suggests that outermost pipe 32 of Masaaki is a waveguide. This suggestion is submitted to be both incorrect and entirely inconsistent with the disclosure provided by Masaaki because Nowhere does Masaaki describe or suggest that the outermost pipe is a waveguide and nowhere does Masaaki describe or suggest that the outermost pipe performs any function, which involves guiding microwaves in any way. Rather, Masaaki only describes guiding of microwaves in the context of guiding microwaves to the 'ultraviolet lamp' (15; 16; 17; 18), which function is principally provided by the rod shaped antenna 13, thereby leading to radiation of ultraviolet rays from the 'lamp' as shown at Fig. 2. Most importantly, the outermost

pipe 32 is described by Masaaki (on page 11, line 16 to page 12, line 20 of the JP translation) only in the context of a water circulation system that is arranged for cooling of the gas discharge chamber. Masaaki states on page 12, line 22 to page 7 of the JP translation:

“A liquid housing chamber 33 for covering the periphery of the gas discharge chamber 18 is formed between these outermost pipe 32 and outer pipe 17. Pure water is filled in the liquid housing chamber 33, and the upper part and the lower part of the liquid housing chamber 33 are connected by a circulation passage 34. In the circulation passage 34, a pump 35 for circulating the above-mentioned pure water and a water temperature controller 36 for adjusting the temperature of the pure water are installed. “

Thus, it is submitted that Masaaki describes the outermost pipe 32 only as a component of a water circulation and cooling system (32; 33; 34; 35; 36) and not at all in relation to any guiding of microwaves. Accordingly, it is submitted that the Examiner's suggestion that outermost pipe is a 'waveguide' is unfounded and without any support in Masaaki. Withdrawal of the Examiner's rejection based on Masaki is respectfully requested.

With regard to the Examiner's reliance on Spero, it has only been relied on for their teachings related to some dependent claims. Spero also fails to disclose the above combination of elements as set forth in independent claim 48. Accordingly, Spero fails to cure the deficiencies of Masaaki.

Accordingly, neither of the references utilized by the Examiner individually or in combination teaches or suggests the limitations of independent claim 48 or its dependent claims. Therefore, Applicants respectfully submit that independent claim 48 and its dependent claims clearly define over the teachings of the references relied on by the Examiner.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. §§ 102 and 103 are respectfully requested.

### **Additional Claims**

Additional claims 81-89 has been added for the Examiner's consideration. Support for new claims 81-89 can be found in claims 5, 7 and 8 as originally filed, on page 2, the last three paragraphs of the specification as originally filed, and on Figs. 1 to 4 as described on pages 4 to 6 of the specification as originally filed.

Applicant respectfully submits that the combination of elements as set forth in new independent claim 85 is not disclosed or suggested by the references relied on by the Examiner.

In addition, claims 81-84 and 86-89 depend, either directly or indirectly, from independent claims 1 and 85, and are therefore allowable based on their respective dependence from independent claims 1 and 85, which are believed to be allowable.

Favorable consideration and allowance of additional claims 81-89 are respectfully requested.

### **CONCLUSION**

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact Joe McKinney Muncy, Registration No. 32,334 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By 

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